

REMARKS

In the last Office Action, claims 39-41 were objected to because of several mistypings of "rotory" instead of --rotary-- and appropriate correction was required. Claims 39-40 were rejected under 35 U.S.C. §102(b) as being anticipated by any one of EP 1 016 785 to Song, US 5,596,963 to Lai, US 3,989,011 to Takahashi, US 4,553,513 to Miles et al. ("Miles") and US 6,526,937 to Bolonkin. Claims 41-44 were allowed.

Applicants and their attorney acknowledge with appreciation the allowance of claims 41-44.

Applicants also appreciate the Examiner pointing out several instances of misspelling of "rotary" in claims 39-41. In accordance with this amendment, claims 39-41 have been amended to correct each occurrence of "rotory" to --rotary-- thereby overcoming the objection.

Lastly, applicants respectfully traverse the multiple anticipatory rejections of claims 39 and 40 based on any one of Song, Lai, Takahashi, Miles and Bolonkon.

A rejection for anticipation under 35 U.S.C. §102 requires that each and every limitation of the claimed invention be disclosed in a single prior art reference. In addition, the reference must be enabling and describe the applicant's claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of

the invention. In re Paulsen, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994); In re Spada, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990). If the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if that element is "inherent" in the reference disclosure. To establish inherency, extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." In re Robertson, 49 USPQ2d 1949, 1950-1 (Fed. Cir. 1999) (quoting Continental Can Co. v. Monsanto Co., 20 USPQ2d 1746, 1749 (Fed. Cir. 1991)). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." Id. at 1749 (quoting In re Oelrich, 212 USPQ 323, 326 (CCPA 1981)).

None of the references relied upon to establish anticipation discloses each and every element of claims 39-40 and thus none anticipates the claims.

Song relates to sliding vane rotary machines designed to balance the inertial force of the movement between the sliding vanes to reduce the dynamic pressure of the vane tips on the cylinder wall and of the sliding vanes on the sliding paths, to lower the waste from friction and to improve the seal environment. However, the reference does not

disclose the fourth step of independent claim 39, namely, a constant pressure combustion process, which follows a limited temperature constant volume combustion process (third step). To the contrary, Song discloses in paragraph [0043] at column 17, lines 18-20, that during the combustion process "the temperature and pressure inside the combustion chamber are raised under nearly isovolumetric conditions". As Song does not disclose a constant pressure combustion in the final combustion phase as required by claim 39, the reference cannot anticipate independent claim 39 and dependent claim 40.

The sliding vane rotary engine disclosed by Lai does not operate according to the method of claims 39-40. In particular, independent claim 39 includes in the fourth step a power expansion phase...so that the pressure of the combustion products within the turbine expansion chamber reaches ambient pressure or near ambient pressure when the turbine expansion chamber volume reaches its maximum. Thus the claim requires full expansion to ambient pressure, or near ambient pressure, and such is not anywhere disclosed in Lai. To the contrary, Lai describes at column 4, lines 23-26, that "Preferably the compressor chamber 24A has a volume that is larger than that of the motor chamber 24B, an exemplary volume ratio of the chambers 24 being approximately 12:10". As the motor chamber volume is insufficient, this excludes full thermodynamic expansion to ambient pressure. Consistent with this

description, the compressor shown in Fig. 1 is larger in size than the motor chamber. Also, as shown in Fig. 5, the motor expanding pressure PD clearly does not expand to ambient pressure up to a rotation angle 270° , which is the exhaust port opening location as stated in column 7, lines 7-9 "...until the vane 20C begins to traverse the exhaust port 28B (following the 270° position of the third vane 20C)". Thus Lai does not anticipate the method of claims 39-40.

Takahashi discloses a sliding vane rotary engine that uses constant pressure heating. On the contrary, independent claim 39 requires in the third step a limited temperature constant volume combustion process followed by in the fourth step, a constant pressure combustion process. Nowhere does Takahashi disclose or describe a constant volume combustion process and thus the reference cannot anticipate claims 39-40.

Miles discloses a sliding vane rotary engine which, like Takahashi, does not disclose a limited temperature constant volume combustion process followed by a constant pressure combustion process as recited in the third and fourth steps of independent claim 39. As clearly described throughout Miles, the reference pertains to a rotary engine which operates on a single-pass, constant-pressure, thermodynamic process, which is basically a constant pressure combustion Brayton cycle and does not include a constant

volume combustion process. Therefore Miles does not anticipate claims 39-40.

Bolonkin discloses a rotary engine having two combustion chambers configured to run on either the Otto cycle (constant volume combustion) or on the Diesel cycle.

Figs. 11-14 show the thermodynamic cycles for Wankel, Diesel and Eccentric engines. It is clear that the Bolonkin rotary engine does not exhibit a constant volume combustion process followed by a constant pressure combustion process as required by the third and fourth steps of independent claim 39. Accordingly, Bolonkin does not anticipate claims 39-40.

In summary, it can be seen that none of the prior art references discloses each and every limitation of the claimed method and, therefore, none of the references anticipates the subject matter of claims 39-40. In view thereof, applicants respectfully request reconsideration and withdrawal of the prior art rejections.

The only amendment made herein is the correction of the mistyped word "rotary" to --rotary-- to overcome the objection noted by the Examiner. Thus consideration and entry of this amendment certainly will not raise a new issue that would require further search or consideration. Instead, the amendment overcomes the claim objection noted by the Examiner, and thus entry of this amendment is believed warranted under the provisions of Patent Rule 116.

In view of the foregoing, the application is now believed to be allowable form. Accordingly, favorable reconsideration and entry of this amendment together with passage of the application to issue are respectfully requested.

Respectfully submitted,

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